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QUIZ #1

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• 45 Minutes. No materials are allowed. (Number) indicates weighting

• No interaction with another student is allowed during the exam. Cheating will not be tolerated.

-0.4

1. Numbers are stored in the order in which they are printed out in Little Endian. (0.4)

-0.4

2. There are two ways to represent real numbers in computer. Which one is faster and more accurate? (0.4) Binary

-0.4

3. From flip-flops and latches, which one are level sensitive? (0.4) Latches

-0.4

4. What are the functions of the accumulator register in a computer arithmetic/logic unit? (1)

-0.4

5. Store and add values5. How many pins are required for a $16K \times 8$ RAM with common I/O and one CS input? Consider other pins as well if necessary. (1)

-1

-1

6. The MCM6209C is a $64K \times 4$ static RAM chip. How many of these are needed to form a $256K \times 16$ module? (1)

-1

7. Determine how many bits each of the following registers can hold? (0.7)

-0.4

PC, DAR, IR, DR, ACCA, Address Latch/Buffer, Data Buffer

-0.4

8. Assume that initially $[PC] = C807$, $[A] = 09$, and $[C457] = 08$. (0.6)

-0.2

C807 BB ; ADDA

C808 C4

C809 57

-0.2

At the completion of this instruction, $[PC] =$ 2007, $[A] =$ 01, and $[C457] =$ 03.

-0.2

9. Examine the following 68HC11 MPU program and answer the following questions: (2)

-1.5

E230 B6 ;LDAA

E231 F6

E232 07

E233 B0 ;SUBA

E234 F6

E235 07

E23D 3E ;WAI

-0.2

(a) How many times does the address F607 appear on the address bus? 2(b) How many times does the MPU perform a memory READ operation except WAI instruction? A WRITE operation? 1 read, 1 write

-0.2

(c) How many times is a new word loaded into the IR? 2

-0.2

(d) How many times is a new word loaded into the DR? 2

-0.2

(e) How many times is a new word loaded into ACCA? 2

-0.2

(f) What are the final contents of ACCA? [A7] = \$F [A6] = \$3

-0.2

(g) Repeat problem (b) including WAI. 1 read, 1 write

-0.2

10. Assume that the following operands are initially stored in data memory: $[C350] = 0A$, $[C351] = 01$, $[C352] = FF$. (2)

-1

C300 B6 ;LDAA [A] = 01

C301 C3

C302 50

C303 B0 ;SUBA [A] = 01 - 50 = 0 - 1

C304 C3

C305 51

C306 27 ;BEQ

C307 03

C308 B7 ;STAA

C309 C3

C30A 52

C30B 3E ;WAI

C30C ??

7. Determine how many bits each of the following registers can hold? (0.7)

0.4 PC, DAR, IR, DR, ACCA, Address Latch/Buffer, Data Buffer
24 8 8 8 8 8

8. Assume that initially $[PC] = 0807$, $[A] = 09$, and $[C457] = 08$. (0.6)

0.4 C807 BB ; ADDA
C808 C4
C809 57

5 9 0000 0000 0000 0000
0000 0000 0000 0000
0000 0000 0000 0000
0000 0000 0000 0000

At the completion of this instruction, $[PC] = 0808$, $[A] = 09$, and $[C457] = 08$.

9. Examine the following 68HC11 MPU program and answer the following questions: (2)

1.5 E230 B6 ;LDAA
E231 F6
E232 07
E233 B0 ;SUBA
E234 F6
E235 07
E23D 3E ;WAI

(a) How many times does the address F607 appear on the address bus? 2

(b) How many times does the MPU perform a memory READ operation except WAI instruction? A WRITE operation? ~~Read~~ ~~Write~~

(c) How many times is a new word loaded into the IR? 6

(d) How many times is a new word loaded into the DR? 1

(e) How many times is a new word loaded into ACCA? 1

(f) What are the final contents of ACCA? $[A] = 40F$

(g) Repeat problem (b) including WAI. ~~Read~~ ~~Write~~

10. Assume that the following operands are initially stored in data memory: $[C350] = 0A$, $[C351] = 01$, $[C352] = FF$. (2)

1.5 C300 B6 ;LDAA $[A] = 0A$
C301 C3
C302 50
C303 B0 ;SUBA $[A] = 0A - 50 = 0A$
C304 C3
C305 51
C306 27 ;BEQ
C307 03
C308 B7 ;STAA
C309 C3
C30A 52
C30B 3E ;WAI
C30C ??

$[A] = 0A$ $[C351] = 01$

(a) What will be $[A]$ and $[C352]$ at the completion of the program? $[A] = 0A$ $[C352] = FF$

(b) Assume that $[C351] = 0A$ initially and repeat (a). $[A] = 0A$ $[C351] = 0A$

11. A certain program has the op code for a BEQ instruction at address 07A2. What offset should be used to cause branching to 07BC2? (0.5)

0.5

186
240

3C 1011 0000
0000 0000 0000
0000 0000 0000

3.6 /10